ON SCIENCE AND TECHNOLOGY IN THAILAND

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1. INTRODUCTION

Discussion of Thai Science and its application to economic development generally concludes with the statement that science is a neglected area in Thailand. Particularly, many feel that the role and importance of science in development is not fully appreciated in planning circles. As a result, science does not receive the support and consideration for organizational change that is required to make it effective in fulfilling its role. How true is this and how can it be tested ?

As the same time there is much discussion of the policies and administrative structures needed to promote and coordinate science and technology for application to development. The purpose of this note is to examine some of these issues paying particular attention to what sort and how much planning and policy may most effectively promote and help science fulfill its role. The views expressed are, of necessity, very subjective, personal and those of a most interested visitor to Thailand.

2. SCIENCE POLICY IN ADVANCED COUNTRIES : the Implication for Thailand.

In the technologically advanced countries, the ideas and concepts which form science policy have undergone drastic changes. In the 1950's and the early 1960's the importance of a strong science and technological base for national development was readily and completely accepted–perhaps all too readily accepted. The chief concern was then to stimulate interest and to develop the atmosphere and environment which would attract students to science and keep them in scientific careers. As a result, there was a massive growth in the scientific and technical capability until now between two and three percent of the Gross National product is typically devoted to research and development.

At present the situation is much changed. With this massive expenditure, an apparent over–production of scientists and growing concern that technological solutions may have been over–emphasized, science policy has now turned to questions of how much science, what are the priorities, what type of activity is needed and how can this best be directed. Ultimately, science policy is a practical matter and the change of emphasis reflects the changed needs and circumstances ?

Where does Thailand fit into this picture ? At what stage of development does it find itself and what mix of emphasis is appropriate to the Thai need and circumstance.

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In addition for Thailand there is the most important dimension of the relationship between the developing and developed countries. Thailand is not developing in isolation nor in a leading position as were many of the European and North American nations. Rather, it is developing in the presence of technologically advanced nations which have enormous advantages in capital and in organizational as well as technical capabilities. This difference in state of development markedly affects the options and development paths open to Thailand. The impact of this difference is now receiving much discussion in Latin America.[1,2,3] At the same time, Thailand wishes to develop at a much faster rate than did Europe.

Also, while science and technology as we think of it today are new, Thailand has a long and rich cultural and spiritual background. Technology does not enter a vacuum. Rather. significant and in some cases enormous adjustments in traditional views and pattenns are required to accommodate it. If technology is desired, these adjustments must be faced and weighed carefully for benefit and loss and their importance must be included in any policy formulation.

From these differences it is clear that Thailand does not fit into any given category. Rather Thailand must develop its own plans and policies for science which take account of its present state of development, its special national characteristics and its structural relationship with other nations. How can this be done and what can the practicing scientist and engineer do to contribute ?

3. THE CASE FOR SCIENCE AND TECHNOLOGY

The first step should be a well documented case for science and technology. This must be based largely but not wholly on its role in national development. The case must be presented in a language which the decision maker and planner can understand and appreciate. This will require much background work but there seem to be two broad areas on which a good case could be based.

Firstly, the ability to direct one's own economic affairs in today's competitive world relies ultimately upon competence. Since much of modern enterprise is based upon science, this means a scientific and technological competence. This will be true even if the development policy adopted is importation of as much technology as possible from developed countries. For who is to select the technology, to decide what is appropriate or inappropriate, to know when an agreement or cost is reasonable and how to effect the adaptations required. If these vital decisions are not to be abdicated to outsiders, an active Thai technical combined with economic competence is required[3]

In addition, there will be the inevitable choice as to when to import and when to take advantage of local products and resources. Ultimately in many instances home development or adaptation will be preferred and here an active local capability is unquestionably required.

In the Thai context, some distinction between the direction implied here and control may be useful. To the visitor, the Thai method of maintaining independence is generally via an array of government rules and restrictions to monitor and control activity. At the same time Thai competence has been developed in areas of special national importance particularly government administration. The freedom of Thailand attests to the success of these methods in the past. In the presence of modern and highly technical enterprise, these controls become increasingly difficult to institute and administer effectively. The increasing number of rules and restrictions we now see around us combined with the uneasy feeling that control may be slipping away may signal an over–reliance on this approach. It now seems important to emphasize the capability to become actively involved in enterprise and technical problems and to direct by an active lead in the enterprise or activity itself. It is this type of direction we refer to here and this type requires a technological competence.

Secondly, discussion of the factors limiting economic development is now focussing on technological competence rather than the shortage of capital equipment and infrastructure as the limiting component[4]. This point enters discussions of highly advanced and capital intensive v.s. intermediate methods., for example. But there is no need to go outside Thailand for substantiation of this point. A recent report on Agricultural programmes[5] cited shortage of Thai technicians, counterparts and supervisors as the obstacles to progress in almost all the programmes. The most acute shortage is at the directive level.

Finally, the summary of the third, five year development plan for Thailand contains many inspiring, worth while and optomistic goals, Yet one cannot help feeling that there has been little technical input into these projections. Economists and planners need to work closely with the executing scientists and engineers who can provide information on technical options, what is feasible, areas of national strength that can be called on and where additional capability will be needed.

Based on these broad areas and others, a case for a vigorous Thai scientific and technological base could be made. But it is up to the scientific community to make the case. The case must be made straight forwardly and without personal bias since overstatement the case can lead to eventual disillusionment.

4. SOME PROBLEMS FACING SCIENCE AND TECHNOLOGY IN THAILAND

Given that a case could be made for a strong scientific and technical capability, what are the impediments restricting its development ? These have been accurately documented[6] in Thailand and more succinctly expressed than is possible here. Three issues, however, stand out significantly.

The first is the need to develop structures and organizational methods in which scientific initiative and activity is vigorously encouraged. This will include

programme management methods in which planning and direction can co-exist with independent and original thought in execution. This need is apparant in both universities and government laboratories and many existing problems follow directly from this outstanding need.

While Thai organizational structures are clearly most effective in many areas, they do not seem to carry over well into the reasearch, development and application area. This is not surprising nor does it involve any criticism. Research and development is a relatively new activity in Thailand and not of the traditional activities which reaches into the rich past for which the traditional structures were designed.[7] The need is to accept that these structures may not be suitable, to identify the points of friction and the changes required.

In making these changes, attention to joining the revised institutions to the traditional administration, the planning bodies, commercial enterprise and society as a whole is most important. This part is often lost in the argument for change, As a result, many regard the desire for change as a desire by the scientific community to cut itself off and retire into protective isolation. My experience here suggests that this is not the wish of practising engineers and scientists. Rather, they wish very much to be involved in development-oriented activity but find change is needed to be effective. Both to make the new structures truly effective and to set aside this fear careful attention to change and re-integration is needed.

The second is the need for general and basic education in science and technology in the nation as a whole. There is the distinct impression that Thailand as a nation has little familiarity with technology and that immediate application is being rushed on a society largely unprepared for it. This will require expanding and improving the educational base at all level.

Finally, there is the need to integrate the technological activities in the commercial and government spheres. Since Technology is new to Thailand, most of the science based enterprises have originated from outside Thailand. For many reasons these enterprises continue to look outside Thailand for their technology[8]. As well as encouraging Thai scientists to look to industry, there seems a need to encourage the commercial sector to look to the local capability for solution of their technical problems. This need will grow as both components grow if they are not to develop in isolation. This encouragement will also help enterprise conceived elsewhere to integrate itself into Thailand.[1],[3]

5, ON SCIENCE POLICY IN THAILAND

Discussions on science policy in Thailand are now over 20 years old[6]. The above issues fall clearly under this banner. Yet, there are many in Thailand who would support the above points but who have reservations about science policy. This reservation is based largely on two grounds.

Firstly, science policy in Thailand has largely focussed on the government administrative structure which connects the planners and the scientific community. It has discussed little of what is needed, what the priorities are, how these can be met and what is needed to meet them. As already stated, science policy is a practical matter and has meaning only in relation to other needs, both from the economic development request position and from the capability needs to meet this request position. There is the justified fear that science policy will simply constiute additional administrative machinery that must be passed through and satisfied without providing any analysis and thought to the real issues involved.

Secondly, there is the fear of increased control via science policy; the sort of administrative control that stifles and contains the initiative and independent thought so needed to develop enthusiasm in technological programmes. In many scientific areas in Thailand, there seems already too much control. Yet, since the issues are not raised, this control often lacks direction. There must, of course, be direction. But this can be in broad subject areas leaving considerable freedom in method and execution. If control cannot be replaced by direction, the fear of a rigid and counter productive science policy seems justified. In this event, the question of how much policy and the balance between control and non control becomes a central issue. Ideally, however, this should not be the option.

6. CONCLUSION

This brief discussion suggests that any policy for Science and Technology in Technology in Thailand should be squarely based on Thai needs, problems and special characteristics. Particularly, policy and administrative structure for science formulated elsewhere should be adopted only after careful assessment of the need on which the policy is based.

While there has been much documentation of development needs and of the obstacles facing science and technology, further open discussion of these issues without personal bias seems needed before policy is possible. Scientists and engineers could begin the dialogue by making a clear and convincing case for science and technology based on its importance for national development.

If sciense policy is to be fully accepted by all, it must stay close to the working issues involved and not get lost in abstract administrative changes.

(1) C.V. Vaitsos **Transfer of Technology to Developing Countries through Private Enterprise** (Columbian National Planning Department, February 1970) Mimeograph in English.

(2) M.S. Wionczek **The International Transfer of Technology The case of Mexico** (Document ESA/FF/AC 2/10).

(3) C. Cooper and F. Sercovitch, **The Channels and Mechanism for the Transfer of Technology from Developed to Developing countries,** UNCTAD (TB/B/AC 11/5).

(4) **Industrial Development, Asia and the Far East,** Volume II (Second Asian conference on Industrialization, September 1970, ECAFE) P. 62. **Science nad Technology for Development, proposals for the Second United Nations Development Decade** (UN ST/ECA/133, 1970 (Sales number E. 70 I. 23).

(5) **Agricultural Research Projects Sponsored by International and National Agencies** No 1. 1970 (National Research Council of Thailand).

(6) **See, for example, Workshop on Science Planning and Policy in Thailand,** (NRC report, July 1972), articles in **Science** the publication of the Society of Thailand, and **University Development Commission** reports.

(7) It is now quite widely accepted that on organization must take account of the technology and function pursued (e.g. Joan Woodward, **Management and Technology,** (London H.M.S.O. 1958) or **Industrial organization;** Theory and Practice (Oxford University Press).

(8) J.B. Quinn, **Technology Transfer by Multinational Companies,** Harvard Business Review Vol 47, 147 (1969).